[4910-13-P]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2022-0103; Project Identifier AD-2021-00977-T]

RIN 2120-AA64

Airworthiness Directives; The Boeing Company Airplanes

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: The FAA proposes to adopt a new airworthiness directive (AD) for certain The Boeing Company Model 777 airplanes. This proposed AD was prompted by reports of discrepancies between the center wing tank (CWT) fuel quantity, as indicated by the fuel quantity indicating system (FQIS), and the refueling truck uploaded fuel amount, followed by certain engine-indicating and crew-alerting system (EICAS) messages. This proposed AD would require installing new software in the fuel quantity processor unit (FQPU), or replacing the FQPU with one that includes new software, depending on airplane configuration; and doing a software version check and FQPU operational check. This proposed AD would also prohibit the installation of certain FQPUs on certain airplanes. The FAA is proposing this AD to address the unsafe condition on these products.

DATES: The FAA must receive comments on this proposed AD by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

• Federal eRulemaking Portal: Go to https://www.regulations.gov. Follow the instructions for submitting comments.

• Fax: 202-493-2251.

• Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

• Hand Delivery: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For service information identified in this NPRM, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminster Blvd., MC 110-SK57, Seal Beach, CA 90740-5600; telephone 562-797-1717; Internet https://www.myboeingfleet.com. You may view this referenced service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 2200 South 216th St., Des Moines, WA. For information on the availability of this material at the FAA, call 206-231-3195. It is also available at https://www.regulations.gov by searching for and locating Docket No. FAA-2022-0103.

Examining the AD Docket

You may examine the AD docket at https://www.regulations.gov by searching for and locating Docket No. FAA-2022-0103; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this NPRM, any comments received, and other information. The street address for Docket Operations is listed above.

FOR FURTHER INFORMATION CONTACT: Kevin Nguyen, Aerospace Engineer, Propulsion Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA

98198; phone and fax: 206-231-3555; email: kevin.nguyen@faa.gov.

SUPPLEMENTARY INFORMATION:

Comments Invited

The FAA invites you to send any written relevant data, views, or arguments about this proposal. Send your comments to an address listed under ADDRESSES. Include "Docket No. FAA-2022-0103; Project Identifier AD-2021-00977-T" at the beginning of your comments. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. The FAA will consider all comments received by the closing date and may amend this proposal because of those comments.

Except for Confidential Business Information (CBI) as described in the following paragraph, and other information as described in 14 CFR 11.35, the FAA will post all comments received, without change, to https://www.regulations.gov, including any personal information you provide. The agency will also post a report summarizing each substantive verbal contact received about this NPRM.

Confidential Business Information

CBI is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to this NPRM contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this NPRM, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as "PROPIN." The FAA will treat such marked submissions as confidential under the FOIA, and they will not be placed in the public docket of this NPRM. Submissions containing CBI should be sent to Kevin Nguyen, Aerospace Engineer, Propulsion Section, FAA, Seattle ACO Branch, 2200 South 216th

St., Des Moines, WA 98198; phone and fax: 206-231-3555; email: kevin.nguyen@faa.gov. Any commentary that the FAA receives which is not specifically designated as CBI will be placed in the public docket for this rulemaking.

Background

The FAA has received reports of discrepancies between the airplane FQIS, specifically the CWT fuel quantity and the refueling truck uploaded fuel amount, followed by an engine-indicating and crew-alerting system (EICAS) FUEL DISAGREE message at an early stage of flight (for example, within 3 hours after takeoff), and/or an EICAS INSUFFICIENT FUEL message. At least 25 in-service events have been reported by operators. In at least 17 of these events, the airplanes continued with the mission; of those, six landed at the destination airport, and 11 had to land at a diversion airport.

As a result of those reports, the FAA issued AD 2020-11-11, Amendment 39-19915 (85 FR 34090, June 3, 2020) (AD 2020-11-11) for certain The Boeing Company Model 777 airplanes. AD 2020-11-11 requires a repetitive check of the FQIS fuel quantity calculation for the CWT, developing a process to provide documentation to the flight crew that this check was done, and revising the existing airplane flight manual (AFM) to incorporate verification procedures and flight crew awareness. The preamble to AD 2020-11-11 explains that the FAA considered the requirements “interim action” and was considering further rulemaking. The FAA has now determined that further rulemaking is indeed necessary, and this proposed AD follows from that determination.

Insufficient fuel in the CWT as a result of this discrepancy is due to a design flaw in the FQIS in which the FQIS ultrasonic tank units calibrate incorrect velocity of sound (VOS) in the jet fuel during center tank fueling, which leads to an improper fuel density calculation, and results in the FQIS showing a different fuel amount from the actual fuel quantity in the CWT. Current FQPU gauging software is subjected to this stale VOS value under certain conditions due to insufficient VOS reset functions.

In almost all of the events, the FQIS showed more fuel than the actual fuel quantity in the CWT, resulting in less fuel on the airplane than the required fuel load for the mission. Alternatively, the FQIS could show less fuel than the actual fuel quantity in the CWT, resulting in more fuel on the airplane than the required fuel load for the mission. This issue affects only the CWT and not the main tanks. This incorrect fuel quantity information is also provided to the flight deck Fuel Quantity Display and the flight management function (FMF) of the Airplane Information Management System (AIMS).

The existing airplane maintenance manual and operator fueling procedures require verification that the correct fuel amount required for the current mission has been loaded onto the airplane. The FAA has received reports that verification tasks are either not accomplished or done incorrectly. As a result, the flight crew may be unaware of insufficient fuel loaded in the CWT and the airplane is dispatched for the mission. The airplane onboard fuel management system typically reports fuel quantity anomalies within the first three hours of flight resulting in a FUEL DISAGREE EICAS message and/or an INSUFFICIENT FUEL EICAS message that necessitates fuel check (e.g., leak check) and fuel quantity monitoring. These messages may require the flight crew to take action, such as performing an air turn back or a diversion.

This AD was prompted by reports of discrepancies between the CWT fuel quantity, as indicated by the FQIS, and the actual amount uploaded from the refueling truck. The FAA is issuing this AD to address discrepancies in the CWT FQIS, which can result in an airplane being dispatched with insufficient fuel in the CWT and with the flight crew unaware of the insufficient fuel prior to departure. This condition, coupled with continued flight to the destination airport after receiving EICAS messages while en route to the destination, could result in fuel exhaustion and subsequent power loss to all

engines, thereby resulting in the inability to land at the destination airport or at a diversion airport, possibly leading to flight into terrain.

Other Relevant Rulemaking

AD 2020-11-11 addresses the same unsafe condition addressed by this proposed AD. While an operator is incorporating the requirements in this proposed AD on their fleet, they will have a mixed fleet with different requirements, depending on whether or not the actions in this proposed AD have been accomplished on a given airplane. This could make it challenging for fuel vendors or other personnel to determine whether a particular airplane needed to undergo the procedures required by AD 2020-11-11 when fueling that airplane. The FAA has therefore determined that the actions required by this proposed AD must be accomplished on all affected airplanes in an operator's fleet before the requirements of AD 2020-11-11 are terminated for that fleet. However, once the actions required by this proposed AD are accomplished on all affected airplanes in an operator's fleet, the requirements of AD 2020-11-11 are terminated for that fleet.

FAA's Determination

The FAA is issuing this NPRM after determining that the unsafe condition described previously is likely to exist or develop on other products of the same type design.

Related Service Information under 1 CFR Part 51

The FAA reviewed Boeing Alert Requirements Bulletin 777-28A0090 RB, dated March 30, 2021. This service information specifies procedures for a check of maintenance or delivery records or an inspection to determine the part number of the FQPU for Group 1 airplanes. For Group 1 airplanes with a FQIS-1 FQPU, this service information specifies procedures for removing the existing FQPU and installing certain FQIS-2 FQPU with upgraded software, and doing a software version check and FQPU operational check. For Group 1 airplanes with a FQIS-2 FQPU and Group 2 airplanes,

this service information specifies procedures for upgrading the FQPU software and doing a software version check.

This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in ADDRESSES.

Proposed AD Requirements in this NPRM

This proposed AD would require accomplishing the actions specified in the service information already described. For information on the procedures and compliance times, see this service information at https://www.regulations.gov by searching for and locating Docket No. FAA-2022-0103.

Costs of Compliance

The FAA estimates that this AD, if adopted as proposed, would affect 257 airplanes of U.S. registry. The FAA estimates the following costs to comply with this proposed AD:

Estimated costs

Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
Records review or inspection of FQPU part number for Group 1 airplanes (143 airplanes)	1 work-hour X $85 per hour = $85	$0	$85	$12,155
Group 1 with FQIS-1 FQPU (125 airplanes): Replace FQPU with FQIS-2 FQPU, and do software and FQPU checks	1 work-hour X $85 per hour = $85	$48,300	$48,385	$6,048,125

Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
Group 1 with FQIS-2 FQPU and Group 2 (132 airplanes): Upgrade software and do software check	1 work-hour X $85 per hour = $85	$0	$85	$11,220

The FAA has included all known costs in its cost estimate. According to the software manufacturer, however, some or all of the costs of this proposed AD may be covered under warranty, thereby reducing the cost impact on affected operators.

Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: General requirements. Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

The FAA determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would not have a substantial direct effect on the States, on the relationship between the national

Government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify this proposed regulation:

(1) Is not a "significant regulatory action" under Executive Order 12866,

(2) Would not affect intrastate aviation in Alaska, and

(3) Would not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

The Proposed Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA proposes to amend 14 CFR part 39 as follows:

PART 39 - AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by adding the following new airworthiness directive:

The Boeing Company: Docket No. FAA-2022-0103; Project Identifier AD-2021-00977-T.

(a) Comments Due Date

The FAA must receive comments on this airworthiness directive (AD) by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Affected ADs

This AD affects AD 2020-11-11, Amendment 39-19915 (85 FR 34090, June 3, 2020) (AD 2020-11-11).

(c) Applicability

This AD applies to The Boeing Company Model 777-200, -200LR, -300, -300ER, and 777F series airplanes, certificated in any category, Group 1 and Group 2 as identified in Boeing Alert Requirements Bulletin 777-28A0090 RB, dated March 30, 2021.

(d) Subject

Air Transport Association (ATA) of America Code 28, Fuel.

(e) Unsafe Condition

This AD was prompted by reports of discrepancies between the center wing tank (CWT) fuel quantity, as indicated by the fuel quantity indicating system (FQIS), and the actual amount uploaded from the refueling truck. The FAA is issuing this AD to address discrepancies in the CWT FQIS, which can result in an airplane being dispatched with insufficient fuel in the CWT and with the flight crew unaware of the insufficient fuel prior to departure. This condition, coupled with continued flight to the destination airport after receiving engine-indicating and crew-alerting system (EICAS) messages while in route to the destination, could result in fuel exhaustion and subsequent power loss to all engines, thereby resulting in the inability to land at the destination airport or at a diversion airport, possibly leading to flight into terrain.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) Required Actions

Except as specified by paragraph (h) of this AD: At the applicable times specified in the “Compliance” paragraph of Boeing Alert Requirements Bulletin 777-28A0090 RB, dated March 30, 2021, do all applicable actions identified in, and in accordance with, the Accomplishment Instructions of Boeing Alert Requirements Bulletin 777-28A0090 RB, dated March 30, 2021.

Note 1 to paragraph (g): Guidance for accomplishing the actions required by this AD can be found in Boeing Alert Service Bulletin 777-28A0090, dated March 30, 2021, which is referred to in Boeing Alert Requirements Bulletin 777-28A0090 RB, dated March 30, 2021.

(h) Exceptions to Service Information Specifications

Where the Compliance Time column of the tables in the "Compliance" paragraph of Boeing Alert Requirements Bulletin 777-28A0090 RB, dated March 30, 2021, uses the phrase "the original issue date of Requirements Bulletin 777-28A0090 RB," this AD requires using "the effective date of this AD."

(i) Terminating Action for AD 2020-11-11

Accomplishing the actions required by this AD on all affected airplanes in an operator's fleet terminates the requirements of AD 2020-11-11 for that fleet.

(j) Parts Installation Prohibition

As of the effective date of this AD, no person may install a fuel quantity processor unit (FQPU), part number (P/N) 0320KPU01 (Boeing P/N S345W001-010), on any airplane identified as Group 1 in Boeing Alert Requirements Bulletin 777-28A0090 RB, dated March 30, 2021.

(k) Alternative Methods of Compliance (AMOCs)

(1) The Manager, Seattle ACO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or responsible Flight Standards Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (l)(1) of this AD. Information may be emailed to: 9-ANM-Seattle-ACO-AMOC-Requests@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the responsible Flight Standards Office.

(3) An AMOC that provides an acceptable level of safety may be used for any repair, modification, or alteration required by this AD if it is approved by The Boeing Company Organization Designation Authorization (ODA) that has been authorized by the Manager, Seattle ACO Branch, FAA, to make those findings. To be approved, the repair method, modification deviation, or alteration deviation must meet the certification basis of the airplane, and the approval must specifically refer to this AD.

(l) Related Information

(1) For more information about this AD, contact Kevin Nguyen, Aerospace Engineer, Propulsion Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3555; email: kevin.nguyen@faa.gov.

(2) For service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminster Blvd., MC 110-SK57, Seal Beach, CA 90740-5600; telephone 562-797-1717; Internet https://www.myboeingfleet.com. You may view this referenced service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 2200 South 216th St., Des Moines, WA. For information on the availability of this material at the FAA, call 206-231-3195.

Issued on February 11, 2022.

Lance T. Gant, Director,
Compliance & Airworthiness Division,
Aircraft Certification Service.
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